KEITHLEY 220 PROGRAMMABLE CURRENT SOURCE

FRONT PANEL OPERATION

PROGRAM MODE

SINGLE
Unit cycles through memory until a dwell time of 0sec is encountered and then stops.

CONTINUOUS
Unit cycles through memory until a dwell time of 0sec is encountered and then begins again at memory location 1.

STEP
Unit advances one memory location each time START/STOP button is pushed.

NOTE: Unit cannot be programmed while program is running.

DISPLAY

SOURCE
Displays programmed current source value and allows source to be programmed with DATA and DATA ENTRY buttons. (Limits: 0 to ±101.00mA).

V-LIMIT
Displays programmed voltage compliance and allows limit to be programmed with DATA and DATA ENTRY buttons (Limits: 1 to 105V). V-LIMIT LED flashes when over compliance.

DWELL TIME
Displays programmed dwell time and allows dwell time to be programmed with DATA and DATA ENTRY buttons (Limits: 0msec; 3msec to 999.9sec except memory location 1 which has 3msec minimum).

PROGRAM CONTROL

RESET
Resets unit to memory location 1.

START/STOP
Starts and stops program in single and continuous modes. Advances unit one memory location in step mode.

OUTPUT

OPERATE
Turns on source output (output at terminals is programmed to 0 unless OPERATE LED is on).

DATA ENTRY

COPY
Copies source, V-limit, and dwell time values into succeeding memory locations. Copy is operational only with display in memory mode.

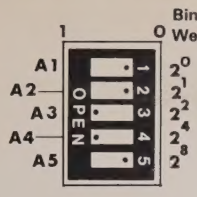
ENTER
Enters displayed source, V-limit, dwell time or memory values, into unit memory.

EXPONENT
Allows entry of exponent information with DATA buttons. Not operational with display in V-limit or in memory mode.

DATA
Allows entry of numeric data for source, V-limit, dwell time, and memory. Only present display mode is affected by data input. The +/- button affects sign of mantissa only in source and sign of exponent in dwell time mode. ENTER button must be pressed after desired value is dislayed.

IEEE-488 PROGRAMMING

PRIMARY ADDRESS DIP SWITCH CONFIGURATION



NOTE: DIP Switch read only upon power up

DISPLAY
D0 = Source
D1 = Voltage Limit
D2 = Dwell Time
D3 = Memory Location

FUNCTION
F0 = Standby
1. Set output current to zero on 2nA range.
2. Reduce voltage limit to less than 32V.

F1 = Operate
Set output to value in memory location.

PREFIX (NDCI, V, W, B, L)
G0 = Location with prefix is transmitted.
NDCI+n.nnnnE+n,V+n.nn00E+n,
W+n.nnnnE+n,L+n.nn00E+n

G1 = Location without prefix is transmitted.
+n.nnnnE+n, +n.nn00E+n,
+n.nnnnE+n, +n.nn00E+n

G2 = Buffer address with prefix is transmitted.
NDCI+n.nnnnE+n,V+n.nn00E+n,
W+n.nnnnE+n,B+n.nn00E+n

G3 = Buffer address without prefix is transmitted.
+n.nnnnE+n, +n.nn00E+n,
+n.nnnnE+n, +n.nn00E+n

G4 = Full buffer with prefix is transmitted.
NDCI+n.nnnnE+n,V+n.nn00E+n,
W+n.nnnnE+n,B+1.0000E+0,
NDCI+n.nnnnE+n,V+n.nn00E+n,
W+n.nnnnE+n,B+2.0000E+0,
NDCI+n.nnnnE+n,V+n.nn00E+n,
W+n.nnnnE+n,B+3.0000E+0,...
NDCI+n.nnnnE+n,V+n.nn00E+n,
W+n.nnnnE+n,B+1.0000E+2

G5 = Full buffer without prefix is transmitted.
+n.nnnnE+n, +n.nn00E+n,
+n.nnnnE+n, +1.0000E+0,
+n.nnnnE+n, +n.nn00E+n,
+n.nnnnE+n, +2.0000E+0
+n.nnnnE+n, +n.nn00E+n,
+n.nnnnE+n, +3.0000E+0,...
+n.nnnnE+n, +n.nn00E+n,...
+n.nnnnE+n, +1.0000E+2
NDCI+n.nnnnE+n for current
V+n.nn00E+n for voltage limit
W+n.nnnnE+n for dwell time
B+n.nn00E+n for buffer address (IEEE buffer)
L+n.nn00E+n for memory location (display)
"N" is replaced with "0" if over compliance condition exists.

STATUS WORD
G0, G2, G4 status word with model number prefix transmitted:
2200000020600:
G1, G3, G5 status word without model number prefix transmitted:
0000020600:

I/O STATUS
G0, G2, G4 I/O status with prefix transmitted:
I/Oii,oo
G1, G3, G5 I/O status without prefix transmitted:
ii,oo
where i is the input from 0 to 15;
where o is the output from 0 to 15.

EOI
K0 = EOI transmitted on last byte out.
K1 = EOI is not transmitted.

SRQ
Mnn: nn=0 to 31 base 10, or
00000 to 11111 base 2.
0 = bit disabled
1 = bit enabled
Bits: SRQ mask
MSB7: N/A
6: N/A
5: N/A
4: Input Port Change
3: End of Dwell Time
2: End of Buffer
1: Over Voltage Limit
0: IDDC, IDDCO or—REN (no Remote)

SRQ BYTE

BIT	DATA	ERROR
MSB7	N/A	N/A
6	SRQ	SRQ
5	Data = 0	Error = 1
4	N/A	N/A
3	Input Port Change	N/A
2	End of Dwell Time	—REN (No Remote)
1	End of Buffer	IDDCO
0	Over Voltage Limit	IDDC

PROGRAM MODE
P0 = Single
P1 = Continuous
P2 = Step

RANGES
R0 = Auto Range (Force Most Significant Number)
R1 = Full scale: 2 nA 2.0E—9 (Preserve Significance)
R2 = Full scale: 20 nA 2.0E—8
R3 = Full scale: 200 nA 2.0E—7
R4 = Full scale: 2 μA 2.0E—6
R5 = Full scale: 20 μA 2.0E—5
R6 = Full scale: 200 μA 2.0E—4
R7 = Full scale: 2mA 2.0E—3
R8 = Full scale: 20mA 2.0E—2
R9 = Full scale: 200mA 2.0E—1

TRIGGER MODES
T0 = Start on TALK
T1 = Stop on TALK
T2 = Start on GET
T3 = Stop on GET
T4 = Start on "X"
T5 = Stop on "X"
T6 = Start on EXTERNAL
T7 = Stop on EXTERNAL

IEEE TERMINATOR CHARACTER
Yc = The (ASCII) byte contains an ASCII character which will be used as the terminator for all data until changed. The power up default is (CR) (LF). [NOTE: ASCII (DEL) indicates no terminator, ASCII (LF) indicates (CR) (LF), and ASCII (CR) indicates (LF) (CR).]
Terminators not allowed: All capital letters; all numbers; (blank); + - / , . e

INPUTS
I(sign)n.nnnnE(sign)nn
Current Source Output Value
Limits: 0 to ±101.00mA
V(sign)n.nnnnE(sign)nn
Voltage Limit
Limits: 1 to 105V
W(sign)n.nnnnE(sign)nn
Dwell Time
Limits: 0 to 999.9sec (1msec steps)
B(sign)n.nnnnE(sign)nn
Buffer Address (IEEE Buffer)
Limits: 1 to 100
L(sign)n.nnnnE(sign)nn
Memory Location (Display)
Limits: 1 to 100

I/O PORT
0n.nnnnEnn
Set control bits on "X"
n = 0 to 16 base 10 or
0000 to 1111 base 2
if 0 then bit low
if 1 then bit high

OUTPUT STATUS STRING ON TALK
U0 = Output status word on next read.
Format: 2 3 0 D F G J K P R T M Y
Default: 2 3 0 0 0 0 0 0 2 0 6 0 0 :
J is cleared to 0 after status word is read.
U1 = Output I/O status on next read.
Read input on X only.
I/Oii,oo = I/O status
where i is the input from 0 to 15
where o is the output from 0 to 15

DEBUGGING
J0 = ROM and LED test
Sets power up status byte, J to 1 in the status string.

Mactac®
StarLiner™
U.S. Patents 3859157, 3900645
PERMANENT
BREAK AT STARLINE
AND STRIP AWAY